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On homothetic cosmological dynamics

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Abstract

We consider the homogeneous and isotropic cosmological fluid dynamics which is compatible with a homothetic, timelike motion, equivalent to an equation of state $\rho + 3P = 0$. By splitting the total pressure P into the sum of an equilibrium part Π and a non-equilibrium part Π, we find that on thermodynamical grounds this split is necessarily given by $p = \rho$ and $\Pi = -4/3\rho$, corresponding to a dissipative stiff (Zel'dovich) fluid.

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